

$$\textcircled{1} \quad x^2 + 4x - 12 = 2$$

$$x^2 + 4x - 14 = 0$$

$$\cancel{(x+7)(x-2)=0}$$

$$\cancel{-2x+7x}$$

$$x^2 + 4x + \underline{4} = 14 + \underline{4}$$

$$\sqrt{(x+2)^2} = \sqrt{18} < \underset{2}{9} < \underset{3}{9}$$

$$x+2 = \pm 3\sqrt{2}$$

$$x+2 = 3\sqrt{2}$$

$$\boxed{x = 3\sqrt{2} - 2}$$

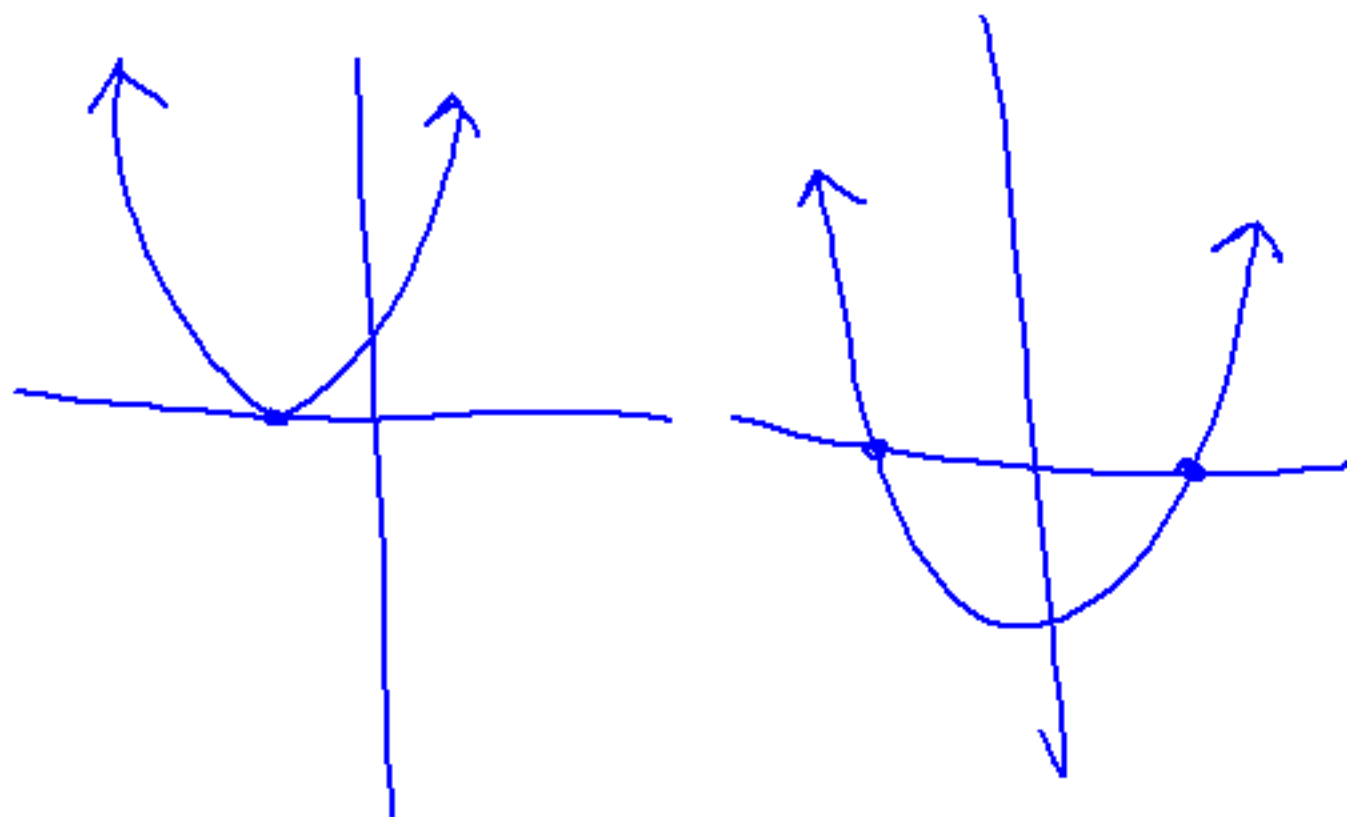
$$x+2 = -3\sqrt{2}$$

$$\boxed{x = -3\sqrt{2} - 2}$$

$$\textcircled{2} \sqrt{(x+2)^2} = 0$$

$$x+2 = \cancel{0} \quad \textcircled{0}$$

$$\boxed{x = -2}$$



$$\textcircled{3} \quad 2x^2 - 4x + 2 = 0$$

$$2(x-1)(x-1) = 0$$

$$(x-1) = 0$$

$$\boxed{x=1}$$

$$2(x^2 - 2x + 1) = 0$$

$$\textcircled{4} \quad 3x^2 - 6x + 27 = 0$$

$$\underline{3(x^2 - 2x + 9) = 0}$$

$$\cancel{3(x)} \cancel{)(x)} = 0$$

$$x^2 - 2x + 9 = 0$$

$$x^2 - 2x + \underline{1} = -9 + 1$$

$$\sqrt{(x-1)^2} = \sqrt{-8} = i\sqrt{8} \quad \text{or} \quad \pm 2\sqrt{2}$$

$$x-1 = \pm 2i\sqrt{2}$$

$$x-1 = 2i\sqrt{2}$$

$$\boxed{x = 2i\sqrt{2} + 1}$$

$$x-1 = -2i\sqrt{2}$$

$$\boxed{x = -2i\sqrt{2} + 1}$$

$$\textcircled{5} \quad x^2 - 6x + 9 = 0$$

$$(x-3)(x-3) = 0$$

$$x-3=0$$

$$x=3$$

$$\textcircled{6} \quad \frac{2(x-1)^2 = 4}{2}$$

$$\sqrt{(x-1)^2} = \sqrt{2}$$

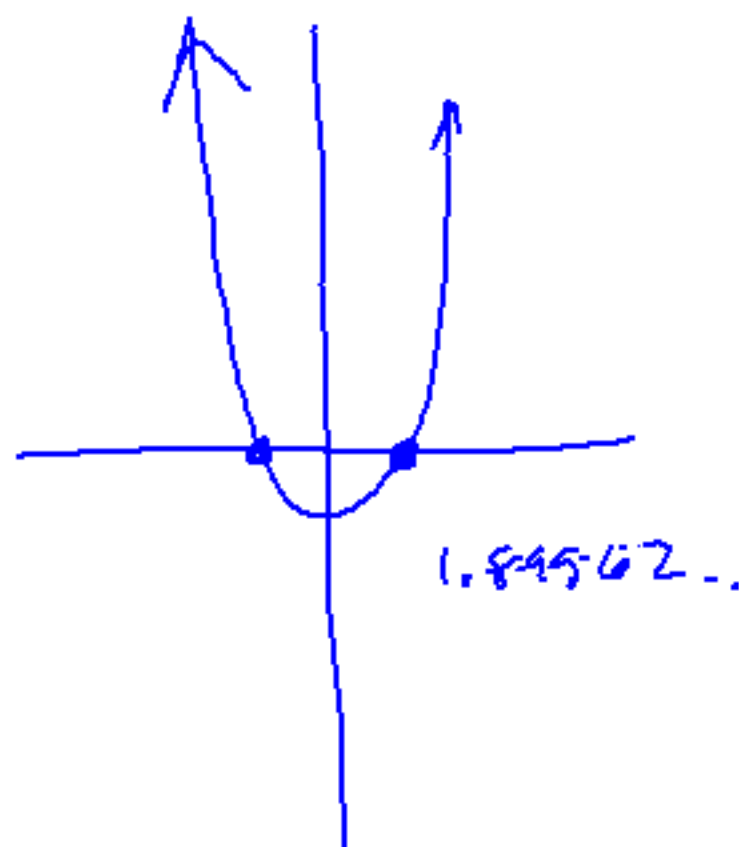
$$x-1 = \pm \sqrt{2}$$

$$x-1 = \sqrt{2}$$

$$x = 1 + \sqrt{2}$$

$$x-1 = -\sqrt{2}$$

$$x = 1 - \sqrt{2}$$



Quadratic Formula

① Factoring $\rightarrow ax^2 + bx + c = 0$

② Completing the square $\rightarrow ax^2 + bx + c = 0$
(can't be factored)

③ $\sqrt{\quad}$ of both sides

$$x^2 = \# \quad (\quad)^2 = \#$$

New = Quad. Formula

Quadratic Eqn: $ax^2 + bx + c = 0$

Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Discriminant = $b^2 - 4ac$

> 0 , then there are 2 real solutions.

$= 0$, then there is 1 real soln.

< 0 , then there are 2 imaginary soln. (i)

$$\textcircled{1} x^2 - 9x + 5 = 0$$

$$\begin{aligned} \text{discr: } & \frac{(-9)^2 - 4 \cdot 1 \cdot 5}{= \cancel{81} - 20} & \begin{aligned} a &= 1 \\ b &= -9 \\ c &= 5 \end{aligned} \\ & = 61 \end{aligned}$$

solns: 2 real

$$\textcircled{2} -7x^2 - 5x + 1 = 0$$

$$a = -7$$

$$b = -5$$

$$c = 1$$

$$\text{discr: } \frac{(-5)^2 - 4 \cdot (-7)(1)}{= 25 + 28}$$

$$= 53$$

$$= 53$$

solns: 2 real solns.

$$\textcircled{1} \quad 5x^2 + 3x - 1 = 0$$

$$a = 5$$

$$b = 3$$

$$c = -1$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot 5 \cdot -1}}{2 \cdot 5}$$

$$x = \frac{-3 \pm \sqrt{29}}{10}$$

$$x = \frac{-3 + \sqrt{29}}{10}$$

$$x = \frac{-3 - \sqrt{29}}{10}$$

$$\textcircled{3} \quad x^2 + 4x + 4 = 0$$

$$a = 1$$

$$b = 4$$

$$c = 4$$

$$x = \frac{-4 \pm \sqrt{4^2 - (4 \cdot 1 \cdot 4)}}{2 \cdot 1}$$

$$x = \frac{-4 \pm \sqrt{16 - 16}}{2}$$

$$x = \frac{-4 \cancel{\pm 0}}{2} = \textcircled{-2}$$

$$\textcircled{5} \quad 3x^2 - 3x + 5 = 0$$

9-60

$$a = 3$$

$$b = -3$$

$$c = 5$$

$$x = \frac{3 \pm \sqrt{(-3)^2 - (4 \cdot 3 \cdot 5)}}{2 \cdot 3}$$

$$x = \frac{3 \pm \sqrt{-51}}{6}$$

$$x = \frac{3 \pm i\sqrt{51}}{6}$$

$$\textcircled{2} \quad x^2 - 2x - 8 = 0$$

$$a = 1$$

$$b = -2$$

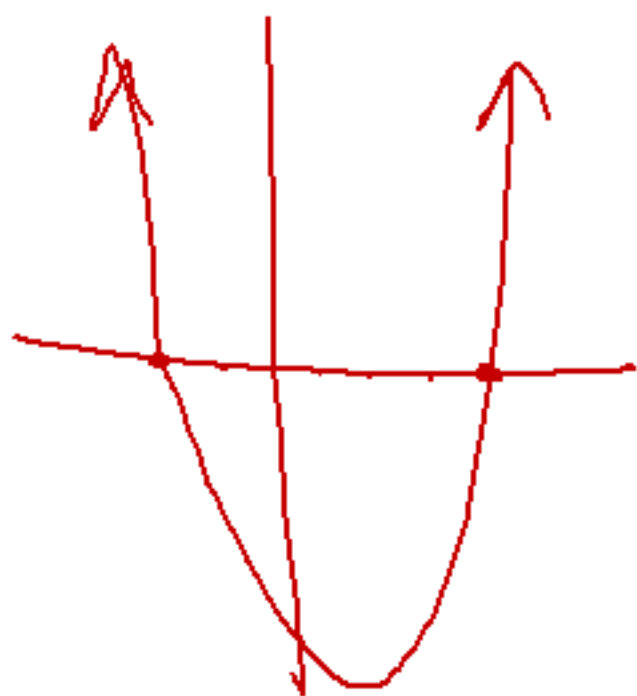
$$c = -8$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - (4 \cdot 1 \cdot -8)}}{2}$$

$$x = \frac{2 \pm \sqrt{36}}{2}$$

$$x = \frac{2 \pm 6}{2}$$

$$x = 4, -2$$

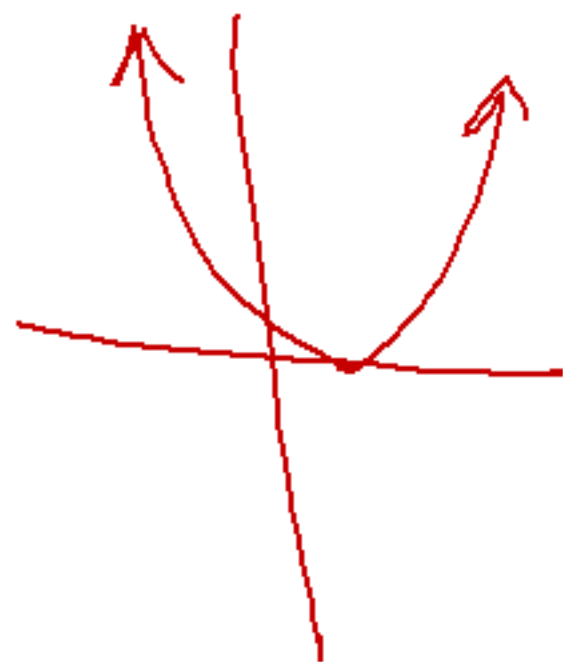


$$\textcircled{4} \quad x^2 - 2x + 1 = 0$$

$$a = 1$$

$$b = -2$$

$$c = 1$$



$$x = \frac{2 \pm \sqrt{(-2)^2 - (4 \cdot 1 \cdot 1)}}{2}$$

$$x = \frac{2 \pm \sqrt{0}}{2}$$

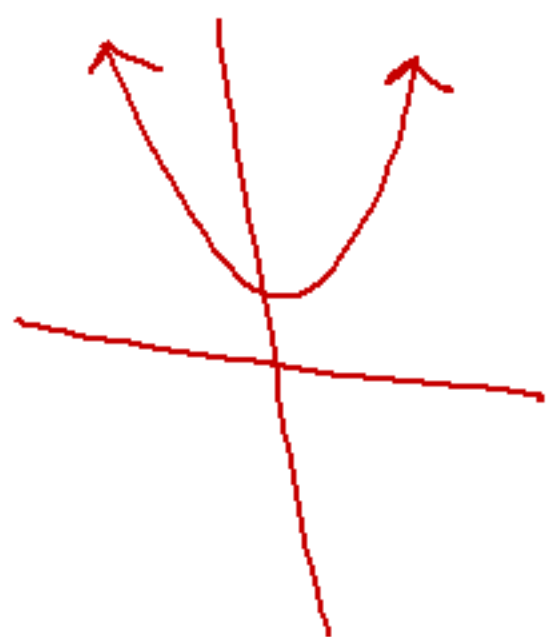
$$x = \frac{2}{2} = \textcircled{1}$$

$$\textcircled{6} \quad x^2 - 6x + 10 = 0$$

$$a = 1$$

$$b = -6$$

$$c = 10$$



$$x = \frac{6 \pm \sqrt{(-6)^2 - (4 \cdot 1 \cdot 10)}}{2 \cdot 1}$$

$$x = \frac{6 \pm \sqrt{-4}}{2}$$

$$x = \frac{6 \pm i\sqrt{4}}{2}$$

$$x = \frac{6 \pm 2i}{2} = \boxed{3 \pm i}$$